This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: D610 – 08 (Reapproved 2019)

Society for Protective Coatings
SSPC-VIS-2

Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces[1]

This standard is issued under the fixed designation D610; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This practice covers the evaluation of the degree of rusting on painted steel surfaces. The visual examples which depict the percentage of rusting given in the written specifications form part of the standard. In the event of a dispute, the written definition prevails. These visual examples were developed in cooperation with SSPC: The Society for Protective Coatings to further standardization of methods. The photographs can be used to estimate the percentage of other coating defects on various substrates. This standard does not include evaluation of rust propagation around an initially prepared scribe, score, or holiday.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Adjunct/SSPC: The Society for Protective Coatings:*

SSPC-VIS 2/ASTM D610 Standard Method of Evaluating Degrees of Rusting on Painted Steel Surfaces[2]

3. Significance and Use

3.1 The amount of rusting beneath or through a paint film is a significant factor in determining whether a coating system should be repaired or replaced. This practice provides a standardized means for quantifying the amount and distribution of visible surface rust.

3.2 The degree of rusting is evaluated using a zero to ten scale based on the percentage of visible surface rust.

3.3 The distribution of the rust is classified as spot rust, general rust, pinpoint rust or hybrid rust.

4. Interferences

4.1 The visual examples that are part of this practice and the associated rust-grade scale cover only rusting evidenced by visible surface rust.

4.2 The use of the visual examples requires the following cautions:

4.2.1 Some finishes are stained by rust. This staining must not be confused with the actual rusting involved.

4.2.2 Accumulated dirt or other material may make accurate determination of the degree of rusting difficult.

4.2.3 Certain types of deposited dirt that contain iron or iron compounds may cause surface discoloration that should not be mistaken for corrosion.

4.2.4 Failure may vary over a given area. Discretion must therefore be used when selecting a single rust grade or rust distribution that is to be representative of a large area or structure, or in subdividing a structure for evaluation.

4.2.5 The color of the finish coating should be taken into account in evaluating surfaces as failures will be more apparent on a finish that shows color contrast with rust, such as used in these reference standards, than on a similar color, such as an iron oxide finish.

5. Procedure

5.1 Select an area to be evaluated.

5.2 Determine the type of rust distribution using definitions in Table 1 and visual examples in Fig. 1, Fig. 2, and Fig. 3.

5.3 Estimate percentage of surface area rusted using the visual examples in Fig. 1, Fig. 2, and Fig. 3 or SSPC-VIS 2, or

[1] This practice is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.25 on Evaluation of Weathering Effects.

This practice has been jointly approved by ASTM and SSPC: The Society for Protective Coatings.

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[2] Colored visual examples are available at a nominal cost from ASTM International Headquarters (request Adjunct ADJD0610A), SSPC Publication No. 00-08 from Society for Protective Coatings (SSPC), 800 Trumbull Drive, Pittsburgh, PA 15205, http://www.sspc.org.

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TABLE 1 Scale and Description of Rust Ratings

Rust Grade	Percent of Surface Rusted	Visual Examples		
		Spot(s)	General (G)	Pinpoint (P)
10	Less than or equal to 0.01 percent		None	
9	Greater than 0.01 percent and up to 0.03 percent	9–S	9–G	9–P
8	Greater than 0.03 percent and up to 0.1 percent	8–S	8–G	8–P
7	Greater than 0.1 percent and up to 0.3 percent	7–S	7–G	7–P
6	Greater than 0.3 percent and up to 1.0 percent	6–S	6–G	6–P
5	Greater than 1.0 percent and up to 3.0 percent	5–S	5–G	5–P
4	Greater than 3.0 percent and up to 10.0 percent	4–S	4–G	4–P
3	Greater than 10.0 percent and up to 16.0 percent	3–S	3–G	3–P
2	Greater than 16.0 percent and up to 33.0 percent	2–S	2–G	2–P
1	Greater than 33.0 percent and up to 50.0 percent	1–S	1–G	1–P
0	Greater than 50 percent		None	

Rust Distribution Types:

S: Spot Rusting—Spot rusting occurs when the bulk of the rusting is concentrated in a few localized areas of the painted surface. The visual examples depicting this type of rusting are labeled 9-S through 1-S (See Fig. 1, Fig. 2, and Fig. 3).

G: General Rusting—General rusting occurs when various size rust spots are randomly distributed across the surface. The visual examples depicting this type of rusting are labeled 9-G through 1-G. (See Fig. 1, Fig. 2, and Fig. 3).

P: Pinpoint Rusting—Pinpoint rusting occurs when the rust is distributed across the surface as very small individual specks of rust. The visual examples depicting this type of rusting are labeled 9-P through 1-P. (See Fig. 1, Fig. 2, and Fig. 3).

H: Hybrid Rusting—An actual rusting surface may be a hybrid of the types of rust distribution depicted in the visual examples. In this case, report the total percent of rust to classify the surface. 9-H through 1-H.

both, by electronic scanning techniques or other method agreed upon by contracting parties.

5.4 Do not consider flow of corrosion products onto the surface of intact coating (that is, "rust bleed" or staining) as part of the surface area rust. It may be helpful to wipe the surface with a damp cloth to remove the rust bleed before evaluating.

5.5 Use percentage of surface area rusted to identify rust grade (see Table 1). Assign rust rating using rust grade of 0-10 followed by the type of rust distribution identified by *S* for spot, *G* for general, *P* for pinpoint or *H* for Hybrid.

NOTE 1—The numerical rust grade scale is an exponential function of the area of rust. Plotting the rust grade versus area of rust results in a straight line in semilogarithmic coordinates. The slope of the line changes at 10 % of the area rusted to allow it to resolve differences below 10 % across rust grades from 10 to 4 while including 10 to 100 % in rust grades 3 through 0.

5.6 The visual examples are not required for use of the rust-grade scale since the scale is based upon the percent of the area rusted and any method of assessing area rust may be used to determine the rust grade.

6. Report

6.1 Identify sample or area evaluated.

6.2 Report rust grade using rating of 0-10.

6.3 Report rust distribution using *S* for Spot, *G* for General, *P* for Pinpoint and *H* for Hybrid.

7. Precision and Bias

7.1 No precision or bias statement can be made for this practice.

8. Keywords

8.1 corrosion; rusting

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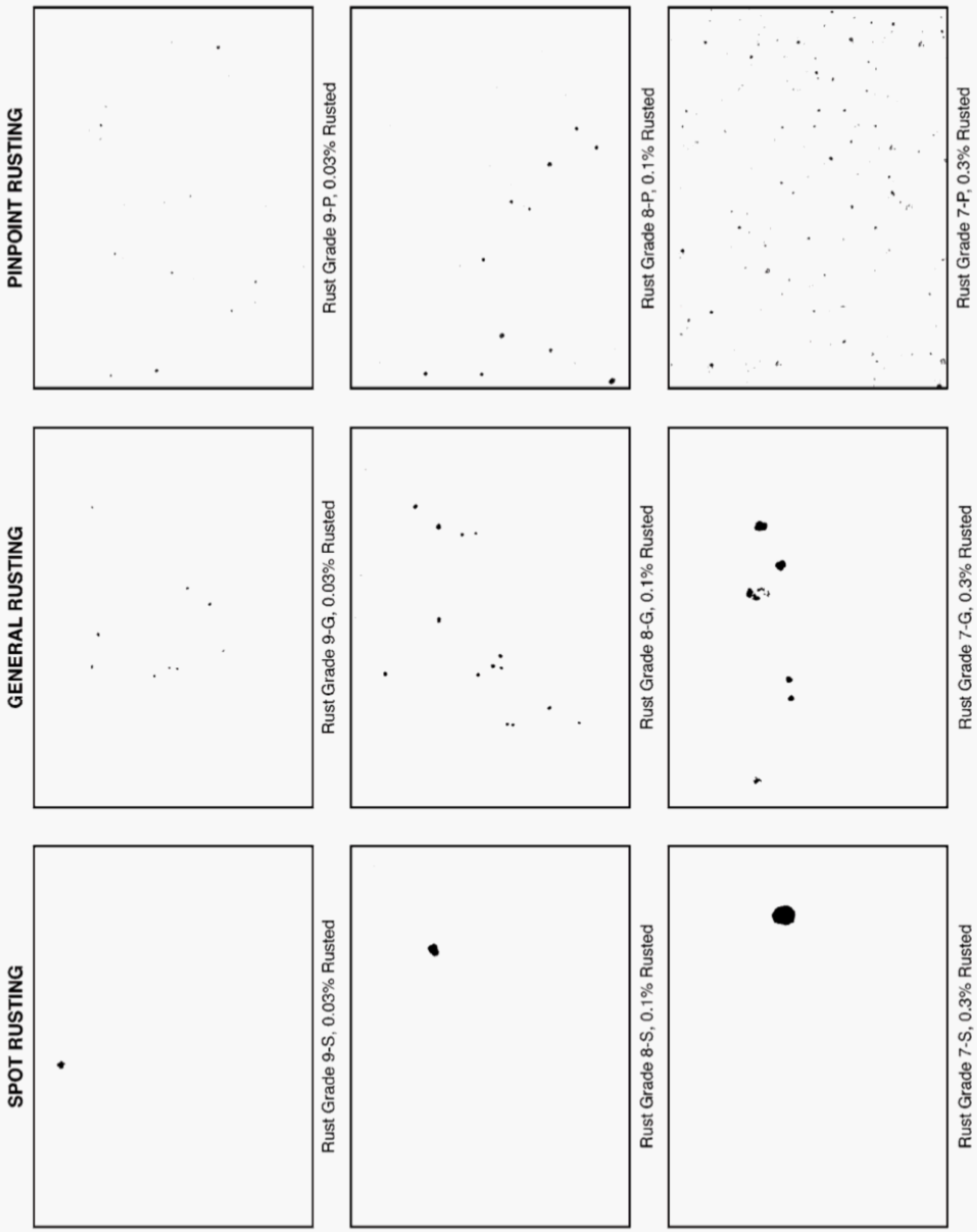

FIG. 1 Examples of Area Percentages

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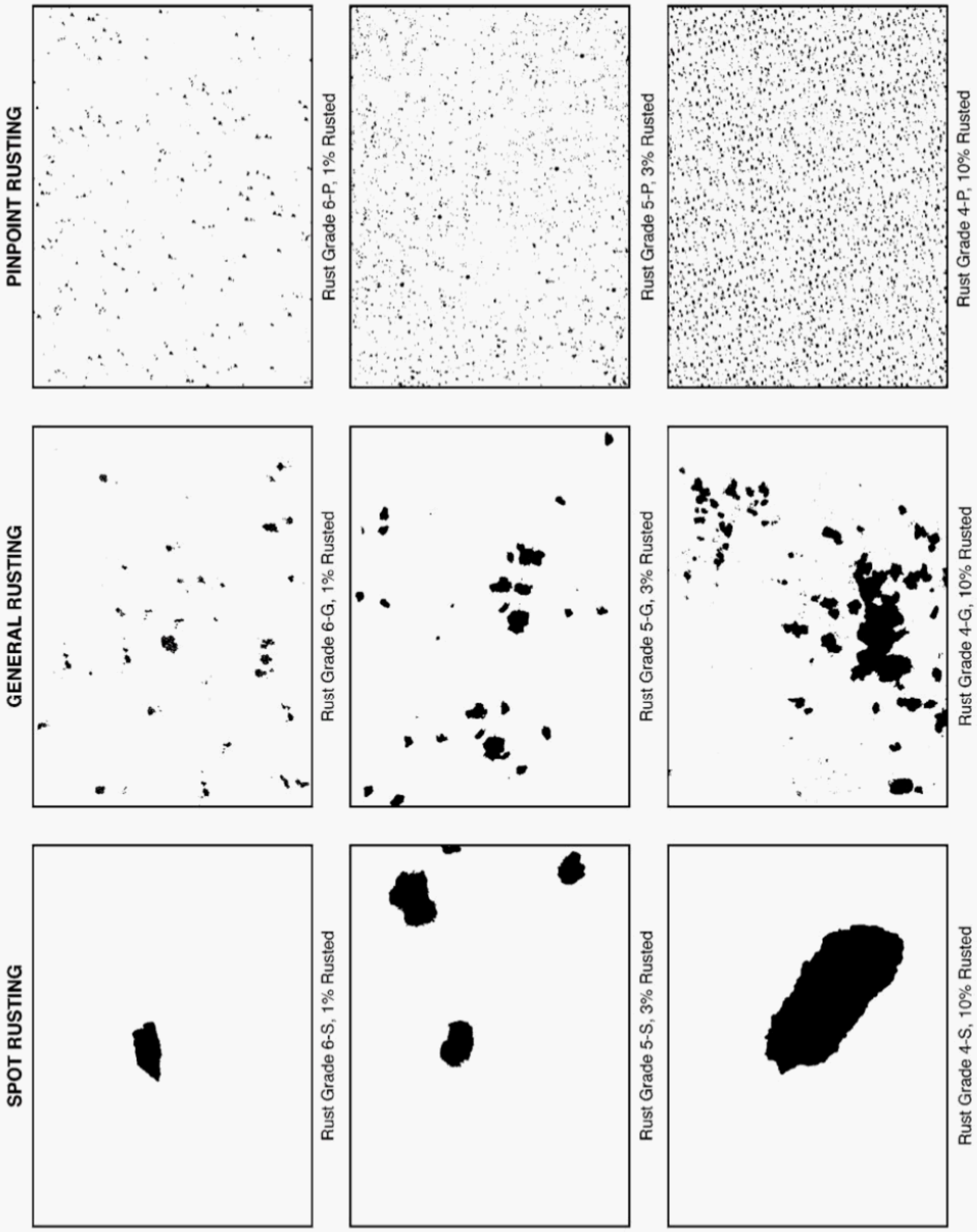

FIG. 2 Examples of Area Percentages

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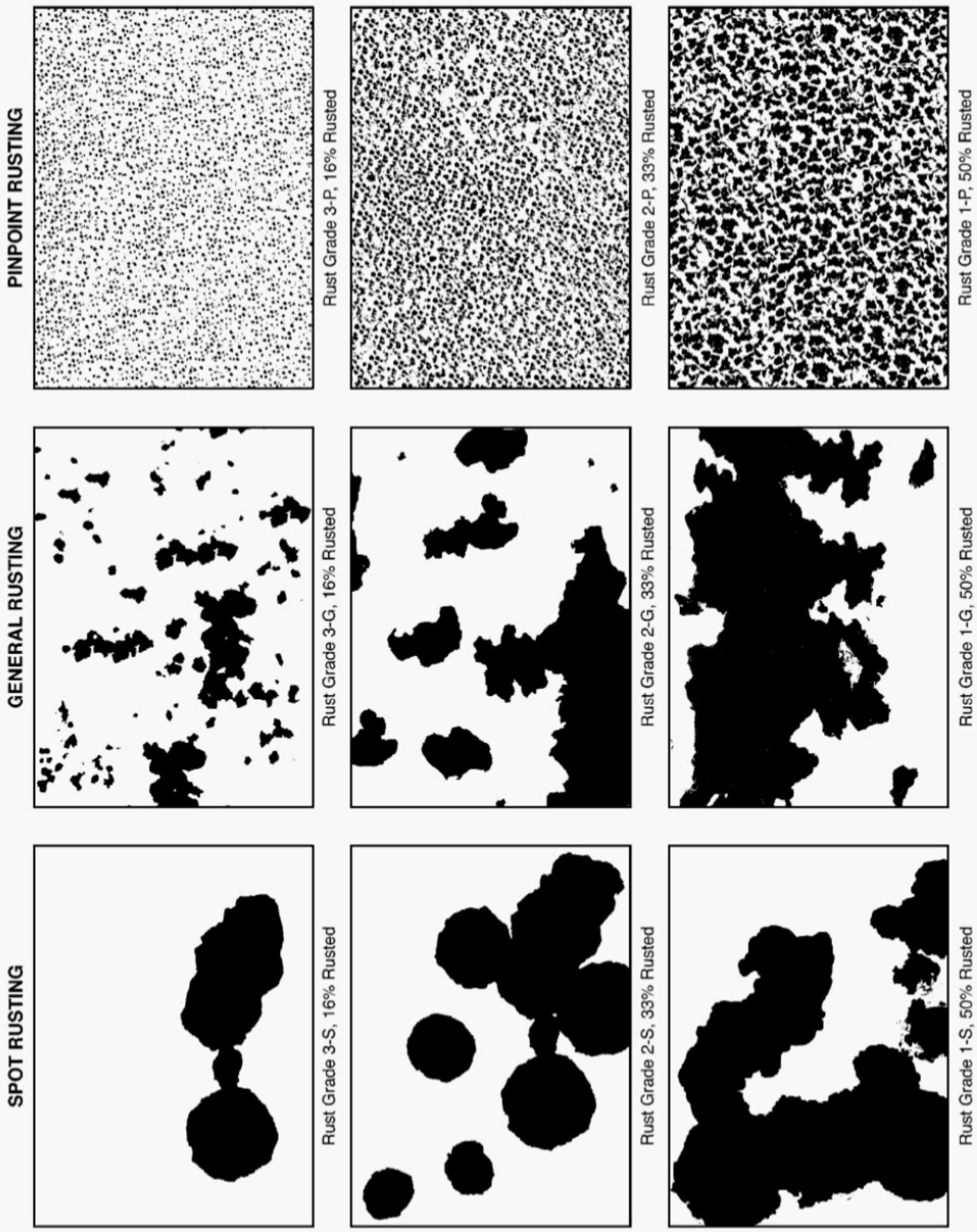

FIG. 3 Examples of Area Percentages

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